

## NEW SPECIES OF *MENTZELIA* (LOASACEAE) FROM GRAND COUNTY, UTAH

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ABSTRACT.—A new species, *Mentzelia* (Section *Bartonia*) *shultziorum*, of the Loasaceae (Mentzelioideae) is described. A close relationship with *M. multicaulis* (Osterh.) Darl. and *M. argillosa* Darl. is suggested based on the morphology of the flowers, leaves, and seeds.

Recent field work in Grand County of southeastern Utah has turned up two populations of an undescribed species of *Mentzelia* (sect. *Bartonia*). This section of *Mentzelia* demonstrates considerable morphological diversity and adaptability and has radiated into many of the diverse and often isolated habitats resulting from the wide range of substrate, elevation, and precipitation of the Colorado Plateau Province of eastern Utah, western Colorado, northern Arizona, and western New Mexico. Many species of this section occur on unusual substrates that are commonly unsuitable for most species because of textural properties or high concentrations of evaporites or minerals. *Mentzelia* is apparently able to exploit these habitats by escaping intense competition from species that occur on more suitable substrates. Edaphic factors and isolation are very important in their speciation and probably account for the many edaphically restricted, and often locally endemic populations of *Mentzelia* in the Colorado Plateau Province. It is from such a small, isolated, unusual substrate that this new species was discovered.

Within *Mentzelia* species recognition is based on subtle and technically difficult characters, and in the section *Bartonia* speciation has created many permutations of the available character states. This has resulted in many taxonomic headaches that standard collecting and herbarium techniques have generally been ineffective in solving. Scanning electron microscopy has greatly facilitated the delimitation of taxa by revealing the microstructure of the seed coat (Hill 1976), thus providing two new characters and several

character states (radial walls straight or wavy and number and shape of papillae on tangential walls) that help elucidate the taxonomic problems. It is on the basis of micromorphological characteristics of the seed and the standard macromorphological characteristics that we recognize this new species.

*Mentzelia shultziorum* Prigge, sp. nov.

Fig. 1

*Mentzelia multicaulis* (Osterh.) Darl. affine, sed ab eo alis seminum 0.20–0.35 mm latis, foliis caulinis ovatis vel obovatis, dentibus non profundis, diversum.

Rounded, much branched, herbaceous perennial 20–30 cm tall; branches generally arching upward; pubescent with glochidiate and pointed hairs. Cauline leaves obovate, ovate or elliptic in outline, 10–30 (33) mm long, 4–20 mm wide, shallowly toothed at margin with 3–4 teeth on each side, cuneate or broadly attenuate at base, rounded obtuse or acute at apex, densely pubescent on both surfaces with both glochidiate and pointed hairs, some of which have pustulate bases. Bracts linear, lanceolate or oblanceolate; 3.5–11.5 mm long; 1.2–2 mm wide; entire or with 1 or 2 short teeth along margin. Flowers with pedicels to 2.5 mm long; calyx lobes 5, 5.4–8.5 mm long, deltoid, acuminate, 2.2–3.0 mm wide at base, calyx tube 1–1.5 mm long; petals 5, yellow, 9.2–15.5 mm long, 2.7–5.2 mm wide, acute at apex, clawed, glabrous; the next whorl within the petals of 5 petaloid stamens, broadly obovate to oblanceolate, 6.5–9.0 mm long, 1.1–3.8 mm wide, with functional anthers; stamens numerous; grading from 9 mm long for the outermost

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Fig. 1. *Mentzelia shultziorum* flowering branch: a, Fruit. b, Flower.

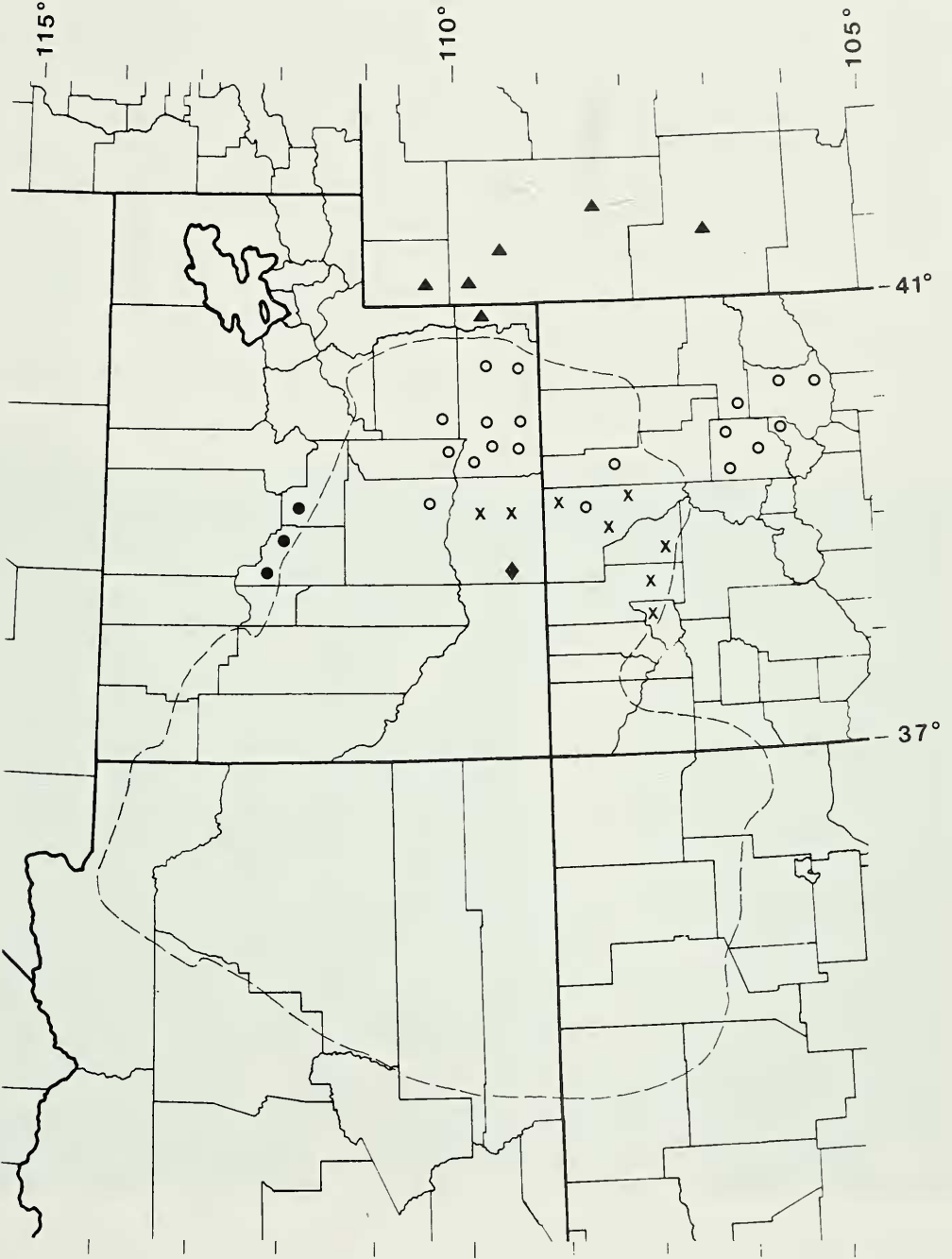


Fig. 2. Map of Utah and adjacent states showing the distribution of *Mentzelia shultziorum* (◆) and some other species that also occur on similar clay substrates: *M. multicaulis* (○), *M. argillosa* (●), *M. marginata* (X), and *M. pumila* (▲). Dashed line represents boundary of the Colorado Plateau Province.

whorl to 3.8 mm long for the innermost whorl; filaments narrow except sometimes for about 3 in the outermost whorl which are up to 1.5 mm wide; anthers 0.7–1.0 mm long; pistil 1,

style 1, 7–9 mm long. Capsules broadly urceolate, 4.0–5.5 (6.0) mm long and topped by a persistent calyx, 4.2–5.0 (5.2) mm diam. Seeds lenticular, dark brown or black, 2.3–2.8

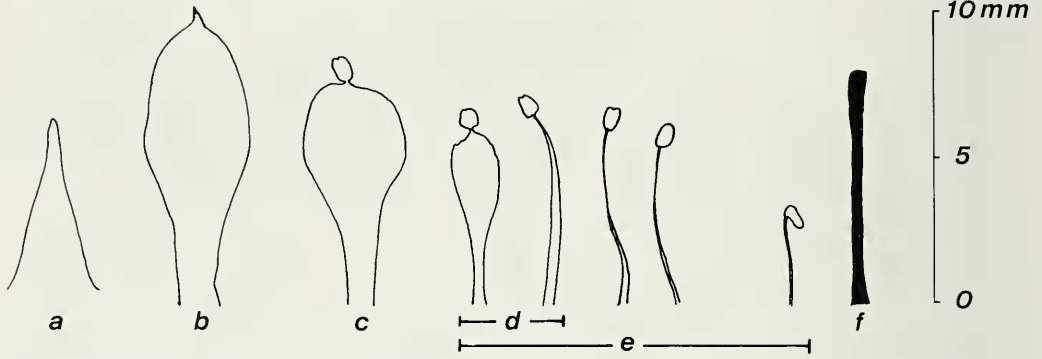


Fig. 3. Floral diagram of *Mentzelia shultziorum* representing elements of the floral whorls: a, Sepal. b, Petal. c, Petaloid stamens. d, Outermost whorl of stamens. e, Stamens from outermost to innermost whorl. f, Style.

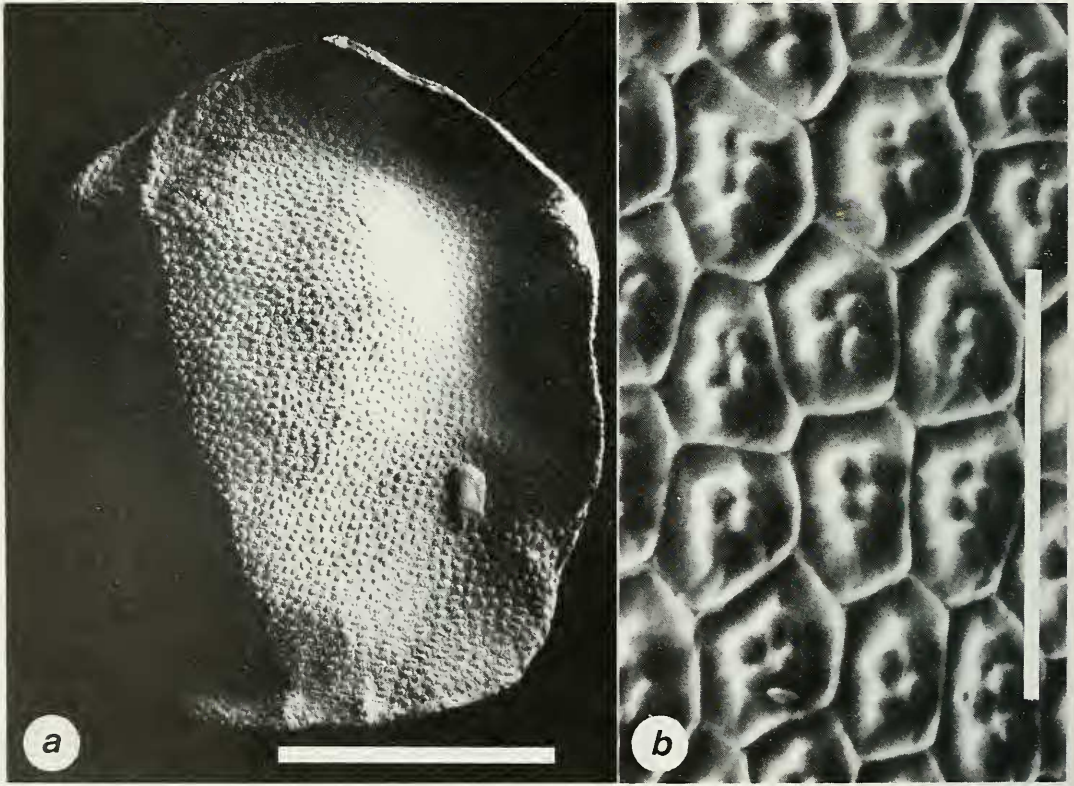


Fig. 4. Scanning electron micrograph: a, Whole seed (white bar = 1 mm). b, Seed coat cells showing straight radial walls and 2-5 papillae on tangential walls (white bar = 0.1 mm).

mm long, 1.4-3.1 mm wide, with a narrow wing 0.2-0.35 mm wide, often ridged on one or both faces, seed coat cells with straight radial walls and with 2-5 papillae on tangential walls. Flowers from July to Sept.

TYPE:—Utah. Grand Co.: 7.3 mi S of intersection of Hwy 128 and Onion Creek Rd in

Fisher Valley, 11 air mi NE of Moab; Elev 5,200 ft; T24S, R24E, Sec 19., *Shultz & Shultz 2070*. Holotype: UTC. Isotypes: RSA.

SPECIMENS EXAMINED:—Utah. Grand Co.: above Onion Creek, 5,200 ft., 7.1 mi E of State Hwy 128 on Fisher Ranch Rd (38° 42' N; 109° 15' W), *Prigge, Shultz, & Shultz 6644*,

(LA); Onion Creek drainage of Fisher Valley (11 air mi NE of Moab) 7.3 mi ESE of Hwy 128: Sec 22, T24S, R24E, 38° 42' N, 109° 15' W, elev 5,200 ft, Shultz, Shultz, & Prigge 9030 (UTC, LA); 9 mi NE of Moab, NW above pass between Castle Valley and Porcupine Canyon, T25S, R23E, Sec 6 NW 1/4, 4,600 ft, Franklin 2201 (BRY).

The specific epithet is in honor of John and Leila Shultz, students of the botany of the Great Basin and Colorado Plateau, who found this new population of *Mentzelia*.

*Mentzelia shultziorum* is known from only two localities in Grand Co., Utah (Fig. 2). At the first locality it occurs near an old uranium and vanadium mine site on gray clay substrates of the Moss Back Member of the Chinle shale, which outcrops locally. It is restricted to steep, sparsely vegetated south-facing exposures on these substrates where alluvial and colluvial erosion rates are high. Associated species are: *Oryzopsis hymenoides*, *Fallugia paradoxa*, *Atriplex canescens*, and *Chrysothamnus nauseosus*. At the second locality it is on dark red clay of the Moenkopi Formation(?) with *Atriplex*, *Eriogonum*, and *Ephedra*.

*Mentzelia shultziorum* possesses no characteristics that are not found in other species of *Mentzelia* (Sect. *Bartonia*) in Utah. However, the combination of characteristics is unique, and its relationships within the section *Bartonia* are not entirely clear. Seed shape, which is lenticular with a narrow wing 0.2–0.35 mm wide (Fig. 4), is similar to that of *M. pumila*; the seed coat cells, which have straight radial walls and 2–5 papillae on tangential walls (Fig.

4), are like those of *M. pumila* (Nutt.) T. & G. as well as *M. multicaulis* (Osterh.) Darl. and *M. argillosa* Darl.; the floral parts, which are of 5 obovate, glabrous petals and 5 obovate, petaloid stamens (Fig. 3), are like those of *M. multicaulis* and *M. argillosa* (to a lesser extent); and the leaves, which are obovate to ovate and shallowly toothed, are similar to *M. marginata* (Osterh.) Thompson & Prigge or *M. pterosperma* Eastw. Based on floral (petal shape, vestiture, and size; petaloid stamens presence/absence), seed (size, winged, seed coat cell radial walls straight or wavy and tangential wall papillae), and cauline leaf (shape and size) characteristics, *Mentzelia shultziorum* is phenetically close to *M. multicaulis* and *M. argillosa* (perhaps closer to the latter) and is probably closely related to these two species. Chromosome counts and hybridization studies will have to be done to confirm its relationship to these two species.

#### ACKNOWLEDGMENTS

I thank John and Leila Shultz for their help in collecting *M. shultziorum*, John Shultz for the Latin diagnosis, Henry J. Thompson for his helpful suggestions and discussions and for the use of his file of SEM micrographs of *Mentzelia* seeds, and Kaye Thorne for the illustration of *M. shultziorum*.

#### LITERATURE CITED

- HILL, R. J. 1976. Taxonomic and phylogenetic significance of seed coat microsculpturing in *Mentzelia* (Loasaceae) in Wyoming and adjacent western states. *Brittonia* 28: 86–112.